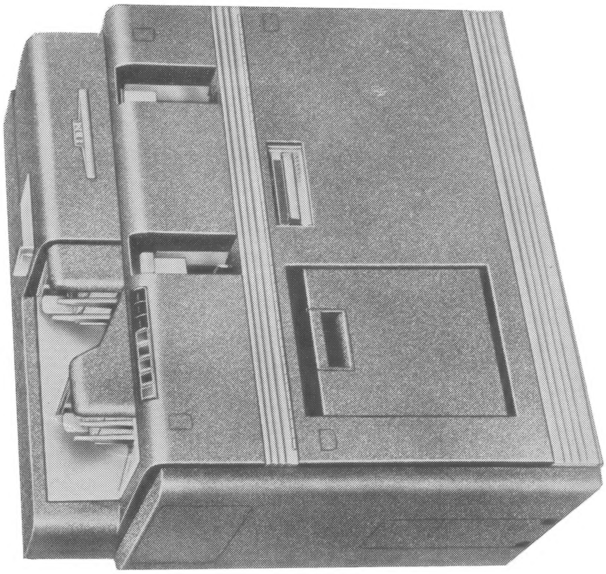
The 519 ELECTRIC DOCUMENT ORIGINATING MACHINE



The 519 ELECTRIC DOCUMENT ORIGINATING MACHINE

is a new IBM reproducing punch that accomplishes—but with greater ease and flexibility—all the functions of a normal reproducer, and at the same time end-prints cards.

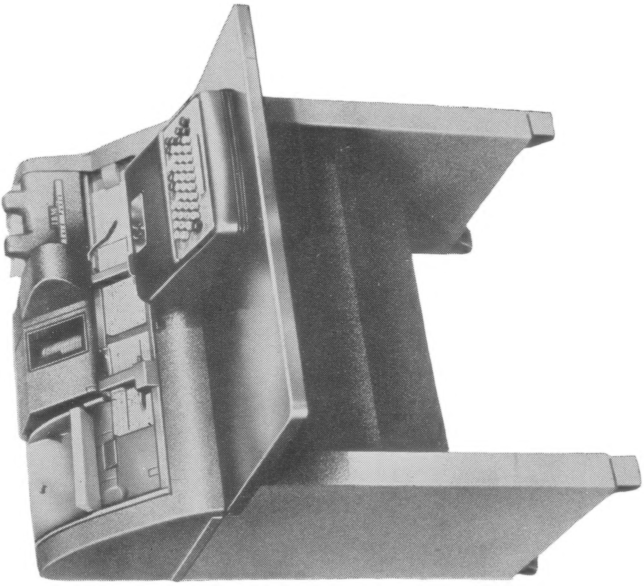
End-printing is a form of interpretation in large bold characters along the left-hand edge of the card. End-printed cards can be filed vertically—which saves valuable space—and, thanks to the legible and conveniently located interpretation, can be pulled speedily and accurately.

Thus the 519 can raise the efficiency of many procedures in inventory accounting, commodity billing, manufacturing control, and other applications in which large files of pre-punched cards are involved. Where end-printed IBM cards are used in time-keeping, the burdensome job of preparing clock-cards becomes a high-speed automatic operation, and the cards themselves are later used for payroll calculation and printing.

The specifications of the 519 include :

- *Reproducing*, as for the 513 Reproducing Punch.
- *Gang-punching*, with complete freedom to offset any or all of the gang-punched information.
- *Comparing* on all 80 columns, to verify automatically the accuracy of reproducing and gang-punching.
- *Mark-sensed punching* of information written on the card in pencil.
- *Summary punching* with any IBM Accounting Machine.
- *End-printing* of up to 16 columns of numerical information, on 2 printing lines of 8 positions each.
- *Speed:* 100 cards per minute.

The 026 ALPHABETICAL PRINTING PUNCH

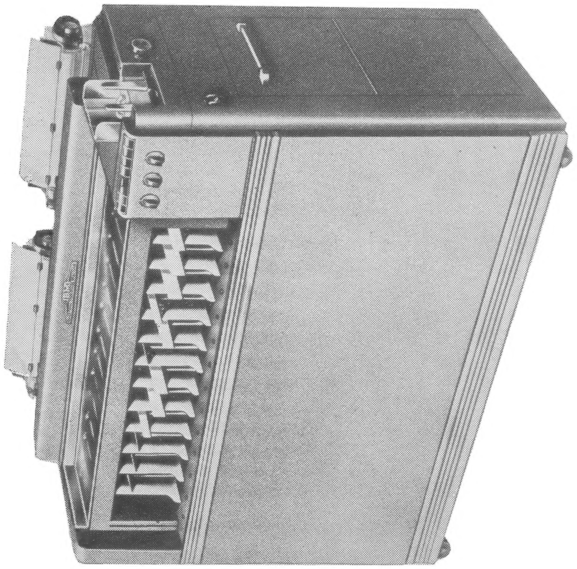


The 026 ALPHABETICAL PRINTING PUNCH is the result of years of operational research in card punching. It embodies many radically new features designed to increase output and ease the operator's job, and is able to print the information it punches.

Features of the 026 include :

- *Automatic card control of programming.* Skipping, duplicating, printing, and shifting from numerical to alphabetical punching are all directed by a programme card mounted on a drum in the machine. This card is an ordinary punched IBM card, easily made up by the operator, and easily changed for another programme card.
- *A new method of duplication.* Information is duplicated into each card from the card immediately preceding it, on the gang-punching principle. This feature makes error correction particularly fast and simple, and reduces card handling to a minimum. Duplicating takes place at 18 columns per second.
- *Printing.* Letters or figures are printed along the top edge of the card, under control of the programme card.
- *Improved card-feeding and visibility.* Cards pass through the machine continuously and quickly. They are at all times easily accessible, and only a few columns of the card are obscured by the punching mechanism—a feature of particular value where dual-purpose cards are used.
- *Light-weight, movable keyboard.* Low-angled and compact, it requires only the lightest touch.

The 101 ELECTRONIC STATISTICAL MACHINE

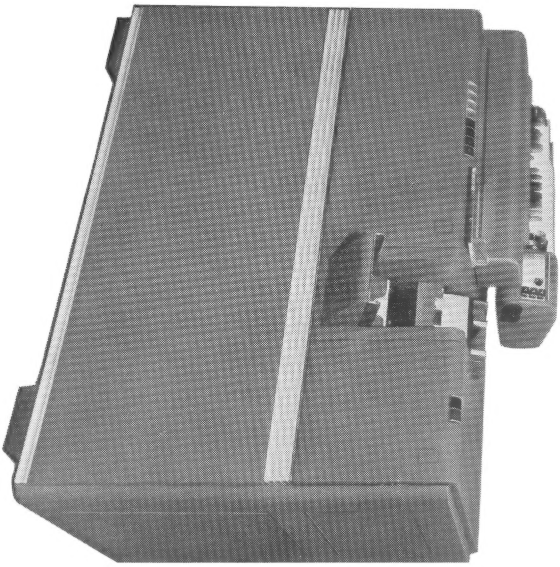


The 101 ELECTRONIC STATISTICAL MACHINE

combines in one unit all the functions necessary for the high-speed analysis of a wide variety of statistical data and the preparation of printed statistical reports.

These functions include :

- *Selection*, from ordinary sorting to complex selection involving multiple columns. The accuracy of sorting is automatically checked. Alphabetic sorting is simplified and the number of card passages necessary is reduced. The sequence of cards can be checked.
- *Editing*. Cards can be checked for consistency according to predetermined criteria—a particularly valuable feature in statistical work.
- *Counting*. Cards are counted simultaneously with selection for as many as 60 different classifications in one run. 4-digit totals are possible in each classification.
- *Accumulating*. Two 5-digit fields can be accumulated to provide 8-digit totals.
- *Printing*. All totals, together with the necessary indicative information, are printed on one or two report sheets.
- *Balancing*. Distributed counts are balanced with total counts, and a check symbol printed on each line of the report.
- *Summary punching*. One or two summary punches may be connected to the 101 to punch total cards.
- *Speed:* 450 cards per minute.



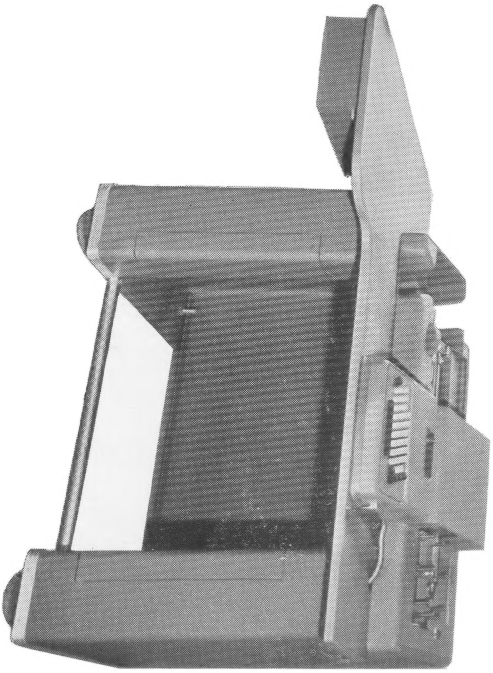
The 421 ACCOUNTING MACHINE

The 421 ACCOUNTING MACHINE

is a high-speed, high-capacity machine, with an unusually flexible programme unit that enables it to carry out a lengthy sequence of arithmetical and logical steps, in very much the same way as a calculator. This ability makes possible the economical preparation of many reports previously outside the scope of an accounting machine.

Features of the 421 include :

- 100 alpha-numerical type-bars.
- 120 net balance counter positions, that can be grouped in almost any combination for sterling or decimal work. Totals can print from any type-bars ; all counters can print progressively.
- 21 selectors, giving 120 positions of selection. Digit filter ; 4 digit selectors. Digit emitter.
- Flexible programme unit, allowing complex operations to be performed on each of up to 20 programme steps. The number of steps taken on any control change is determined by control panel wiring.
- Four classes of total, plus final total.
- Summary punching of up to 10 cards during a programme.
- Two 32-position memory units.
- Fast, accurate, and completely flexible spacing of forms through the IBM Tape-controlled Carriage. Single forms can be automatically fed and positioned by the IBM Bill Feed.
- The 421, like the 441 Dual Feed Accounting Machine, can be linked to a 604 Electronic Calculator to make up an Electronic Accounting Group.
- Speed : 100 cards per minute for listing, 150 cards per minute for tabulating.



The 156 ALPHABETIC VERIFIER

The 156 ALPHABETIC VERIFIER

One of the basic advantages of the IBM method is that the punched hole does not change : in other words, the information entering the accounting machine from any given card is known always to be the same, however many reports it may already have appeared in. Repeated transcription is avoided, but it obviously becomes doubly necessary to ensure that the card contains the correct information in the first place, and this is the function of the verifier.

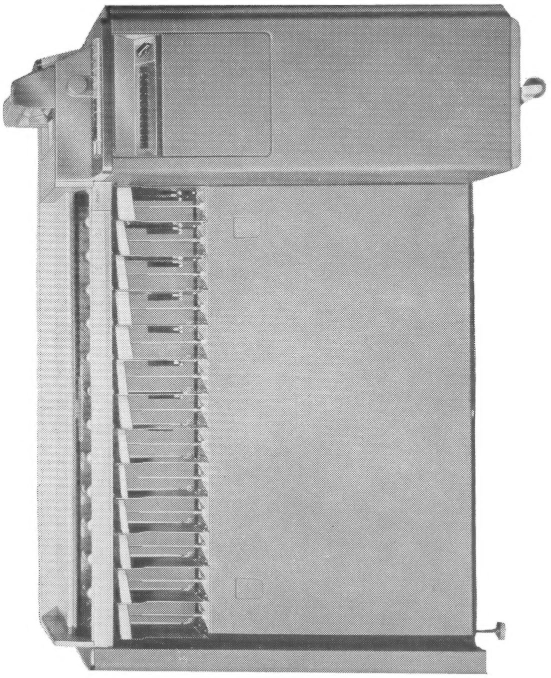
The 156 Verifier is in many ways a close counterpart of the 131 Punch, but instead of blank cards, already punched ones are placed in its hopper. Then, using the source document from which the cards were punched, the operator re-keys the information in the same sequence as the 131 operator punched it. The machine checks the agreement of the holes present in the card with the information being re-keyed. Where agreement is complete the card is automatically ejected and a notch cut in its top right-hand corner.

A discrepancy in any column causes the keyboard to lock immediately and a red light goes on. The operator then has a second opportunity to verify the column. If the error is again detected the red light goes on as before, but this time the machine spaces normally. The operator marks the column in error, and verification continues. When the last column has been verified the card is not automatically ejected, and notching is suppressed.

Error cards are returned, with the source documents, for re-punching (which, thanks to the duplicating device on the punch, is very quickly accomplished).

Features of the 156 include the same rapid automatic feeding and ejection of cards as on the 131 punch ; the same fast skipping ; and the same type of movable, alphanumerical electric keyboard.

The 083
1000-CARDS-A-MINUTE SORTER



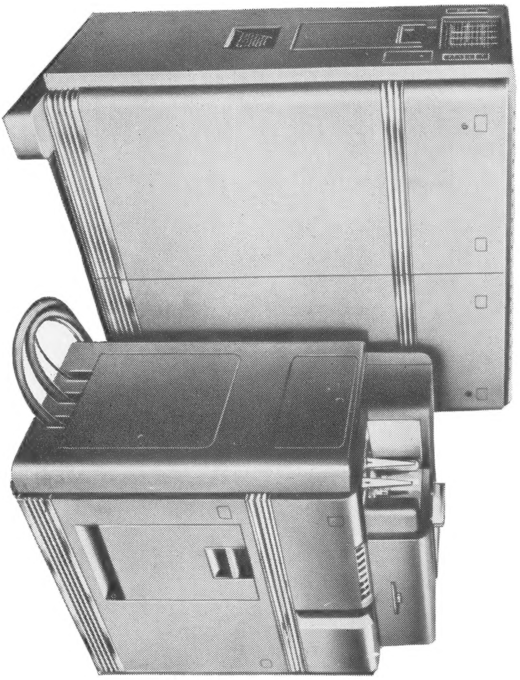
The 083 1000-CARDS-A-MINUTE SORTER

Not many years ago IBM punched records were sorted at 250 and 450 cards a minute. Then more powerful, faster Accounting Machines created a need for a faster Sorter—the 082. Equipped with an electronic unit, the 082 raised the speed of sorting to 650 cards a minute.

Now the even more dramatic increase to 1,000 cards a minute provides, in its turn, an index to the standards of performance of the new generation of IBM Accounting Machines.

- *The* 083 *Sorter is fast:*
  It sorts 1,000 cards a minute.
  Through dynamic braking action it stops in a maximum of three card cycles.
  Cards can be removed from it faster, due to the new stacker design.
  Fewer card passages through the machine are required for alphabetic sorting.
- *The* 083 *Sorter is accurate:*
  Card registration is automatically checked, ensuring accurate sensing.
  Double punching and card irregularities are automatically detected.
  Stacking is positive, flat.
- *The* 083 *Sorter is the simplest to operate:*
  All selection controls have one-touch operation.
  Stackers are adjustable for the most convenient size of card group.
  The feed is slanted for ease of loading and holds 1,200 cards.
  Even stacking reduces joggling and card-handling time.
  Column positioning is simpler.

Form No. 24-5601



The 604
ELECTRONIC CALCULATOR

The 604 ELECTRONIC CALCULATOR

is the world's most widely used electronic calculator—more than 2,000 are installed and in service the world over. The reliability of the 604 has been proved in the field for many years, and its flexibility demonstrated in the hundreds of different calculating tasks to which it has been applied.

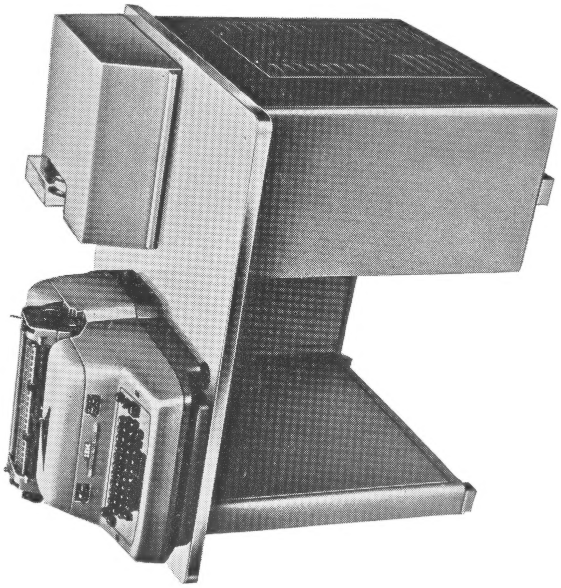
Now the 604 is available in a new high-capacity version (the Model 004), which immensely widens its field of application and increases its usefulness to business. Specifications of the new machine include:

- *Greater programming facilities:* 70 or more programme steps are available for calculation. On each of these the 604 can add, subtract, multiply, or divide, re-arrange data within its memory, round off amounts, or perform similar arithmetical and logical operations.

  More storage positions: An additional 96 positions of input factor storage have been provided. Factors stored in these positions from the card are read out at electronic speed during the programme. Fifty fully electronic storage positions are available for handling factors and both intermediate and final results of calculation.
- *Greater punched output:* Up to 45 digits may be punched in the answer.
- *Longer calculating time:* The normal speed of the 604 is 100 cards a minute but where particularly long calculations are involved, punching can be delayed till the programme has been completed.
- *New features to facilitate sterling calculations.*
- Automatic sign control.
- Double punch and blank column detection in the punch unit, together with the facility to gang-punch common information in cards.

Form No. 24-5602

The 884 TYPEWRITER TAPE PUNCH



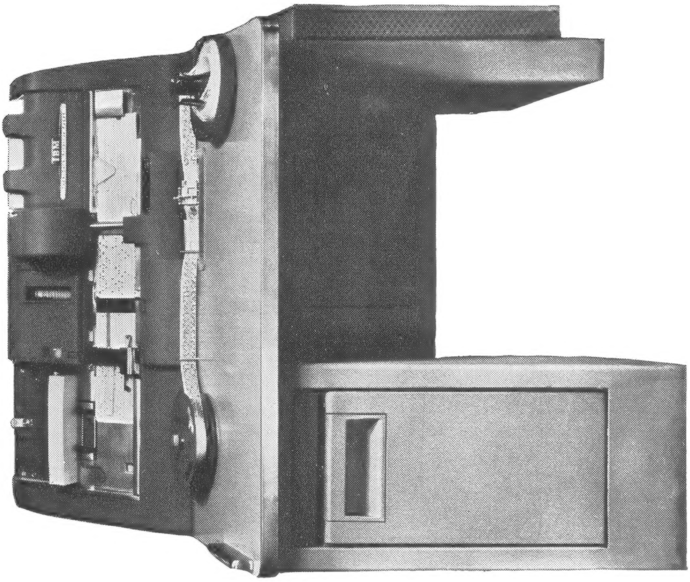
The 884 TYPEWRITER TAPE PUNCH

makes it possible to type a document and at the same time prepare a punched paper tape for later automatic conversion to IBM punched cards. This elimination of the key-punching stage speeds the flow of input information to the IBM data processing system so that reports can be produced with still greater speed and economy.

Features of the 884 include :

- *IBM electric keyboard.* The compact keyboard responds to the lightest touch and gives a clear and consistent impression with up to 20 carbon copies. The tape punch can be switched off and the machine can then be used as a normal upper-case electric typewriter.
- *Tape punching.* As a by-product of typing a document, 8-channel paper tape is punched with such alphabetic or numeric data as is required for later accounting procedures. Produced without extra effort, this tape is automatically converted to punched cards of various formats by the 046 or 047 Tape to Card Punches.
- *Tape code checking.* Should the machine punch an improper code in the tape, the typewriter keyboard will immediately lock, thereby signalling the error to the operator.
- *Flexible programme.* Up to seven different types of cards can be punched from the information typed on a single document. Selection of the tape punching pattern is controlled by a simple plastic programme band punched with appropriate codes. The desired programme for each line of typescript is selected by typing one figure on a strip to the left of the document, and these figures constitute a check on the selection of the correct tape programme by the operator.
- *Error correction.* The operator can easily correct a typing error on the document and indicate the incorrect information in the tape so that incorrect cards may be removed during the tape-to-card operation.
- *Data economically transmitted to a central office.* Paper tape is easily posted from branch offices to a central accounts office. One reel of tape weighing a few ounces holds 24,000 characters —as much as 300 fully-punched IBM cards. Furthermore, 8-channel tape, which provides for special characters, can be transmitted over a private telegraphic line such as many companies have already installed between their branches and Head Office.

The 047 TAPE TO CARD
PRINTING PUNCH



The 047 TAPE TO CARD PRINTING PUNCH

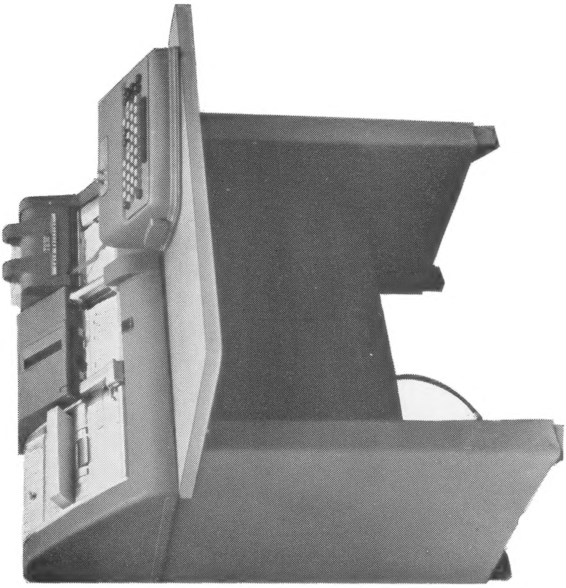
is basically a printing punch similar to the 026, controlled in the same way by a programme drum ; but besides normal key-punching use, the 047 automatically converts the punched paper tape output of the 884 Typewriter Tape Punch into IBM cards of various formats as required, under the direction of a control panel.

Features of the 047 include :

- *Tape to card conversion.* Data contained in punched paper tape is punched and printed in cards at a speed of 18 columns per second.
- *Control panel flexibility.* Control panel wiring allows the punching of seven different types of card from the same tape.
- *Automatic control by programme drum.* A punched card mounted on the programme drum gives automatic control of fast skipping, printing and duplication. Information not contained in the tape can be duplicated in the cards.
- *Checking.* The accuracy of tape reading is automatically checked. Should a punch in the tape register incorrectly in the reader a red light will glow and the machine will stop immediately.
- *Printing.* Letters or figures are printed along the top edge of the card as they are punched, but printing may be suppressed through the programme card. This feature dispenses with the need for subsequent interpretation.
- *Excellent card visibility and fast card feeding.* At any time only nine of the 80 columns are obscured by the punching mechanism. Continuous feeding cuts to a minimum the time taken for a new card to be registered under the punch station.
- *Light, movable keyboard.* When required for key-punching the 047 is equipped with a compact electric keyboard responding to the lightest touch.
- The 046 Tape to Card Punch is also available. This is in every way similar to the 047, except that it is not equipped with the printing feature.

U.K. Form 24-5703

The 056 VERIFIER



THE 056 VERIFIER

brings to the verification of IBM cards the same speed and efficiency as the 024 and 026 Punches achieve in their creation.

Once punched, the information in IBM cards cannot change, and so the same cards can be used to produce many different reports with full confidence in their accuracy. But this very fact makes it all the more essential that the accuracy of the initial transcription should be checked. There are several methods of machine verification of punched cards, including key verification, which is the function of the 056 Verifier.

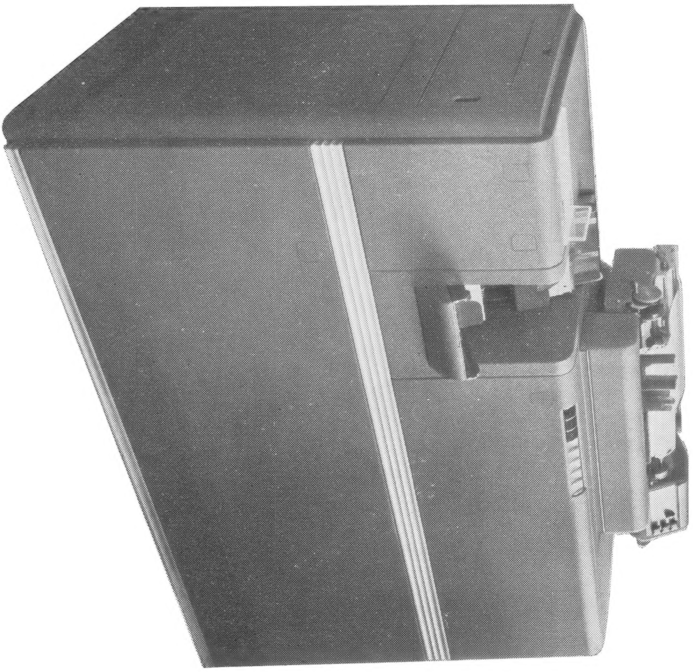
After punching, cards are passed through the 056, where the motions of recording the information are repeated from the same source document, but by a different operator. The 056 checks that the punching in the card corresponds to the key depressions of the operator, and stops as soon as it senses a discrepancy. But since this could result not from a punching error but from a mistake by the Verifier operator, a maximum of two more chances of verifying that column are given before the machine confirms an error and spaces to the next column. All error columns are notched for easy identification when re-punching, and the card is not fed into the stacker. Completely accurate cards are identified by a notch in the right-hand edge.

Positive identification of errors when the original source document is still to hand and the elimination of operator errors are cardinal points in the IBM method of verification.

Features of the 056 include :

- *Automatic card control of programming.* An ordinary punched IBM card easily mounted on the programme drum controls various functions of the 056, including skipping; alpha-numeric shifting ; and the verifying of duplication from the preceding card, at 20 columns per second.
- *New error-marking feature.* All error columns are automatically notched for ease of re-punching.
- A simple means of verifying multiple punching is standard. Optional features are the elimination, by means of the programme card, of the verification of X's and 12's, or of the digits 0 to 9.
- *Improved card visibility and card feeding.* Only a few columns of the card are obscured by the verifying mechanism, making easy the verification of dual-purpose cards. The principle of continuous card feeding cuts to a minimum the time taken for a new card to be registered.
- *Electric keyboard.* Low-angled and compact, the keyboard is easily positioned for most convenient use and requires only the lightest touch.

U.K. Form 24-5704



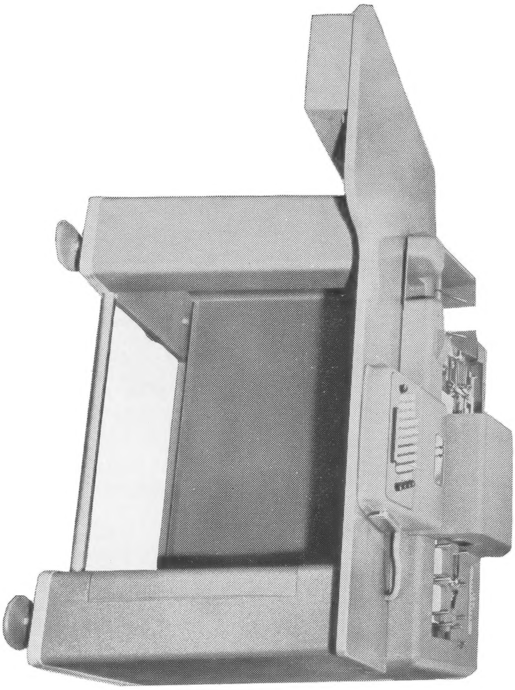
The 420 ACCOUNTING MACHINE

The 420 ACCOUNTING MACHINE

is IBM's ' work-horse ' accounting machine. It is fast, versatile, and its specifications are widely variable. Thus the largest 420 has 88 typebars and 80 counter positions, while the smallest has 55 typebars and 32 counter positions. Speed and flexibility remain the same regardless of capacity.

The 420 is therefore adaptable to the requirements of a very wide range of applications, and is of particular interest to the medium-sized business. Its features (taking the highest capacity 420) include :

- 88 typebars : 43 alpha-numerical, 45 numerical.
- 80 net balance counter positions, that can be grouped in almost any combination for sterling or decimal work. Totals can print from any typebars ; all counters can print progressively.
- 16 2-position pilot selectors and 12 5-position co-selectors, giving 92 positions of selection. Up to 4 digit selectors, which can also be used as emitters.
- Three classes of total, plus final total.
- Cross-addition and subtraction of amounts from individual cards or totals.
- A special programme device can be fitted and provides the same flexibility in programming as on the 421.
- Summary punching of up to 3 cards on a control change.
- Two 32-position storage units.
- Fast, accurate, and completely flexible spacing of forms through the IBM Tape-controlled Carriage. Single forms can be automatically fed and positioned by the IBM Bill Feed.
- Speed : 80 cards per minute for listing ; 150 cards per minute for tabulating.

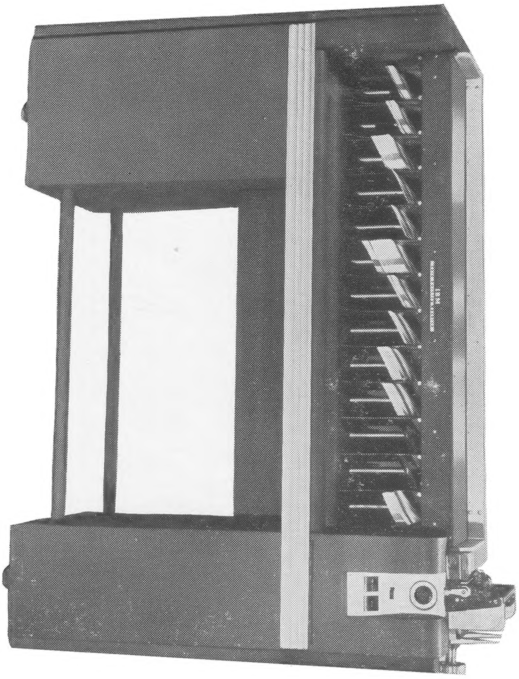


The 131 ALPHABETIC CARD PUNCH

is a compact, modern machine designed for the rapid and accurate key punching of IBM cards. IBM's long experience in the construction of high-speed powered keyboards for its Electric Typewriters is reflected in the keyboard of the 131, which offers the maximum degree of operational ease and efficiency.

Features of the 131 include :

- Rapid automatic feeding and ejection of cards. The card-reversing device stacks the cards in the correct sequence for verification.
- Fast skipping over fields or portions of fields in the card that are not to be punched. The skipping pattern for any card is determined by a small plastic skip bar, which is easily inserted in or removed from the punch.
- A compact, movable keyboard, with a particularly light touch. The alphabetic keys are arranged as on a standard typewriter, so that normal touch typing is possible. Numerical keys are grouped for right-hand punching, and some of them are combined with alphabetical keys. A single key depression is all that is necessary to shift from alphabetical to numerical punching. A signal light indicates which state the keyboard is in.
- Duplicating feature : Repetitive information consisting of any combination of letters and figures can be automatically punched into every card at a rate of 10 columns per second from a master card inserted in the duplicating rack. Information can be duplicated into any columns of the card, and blank columns may be automatically spaced over.



The 082 HIGH SPEED SORTER

The 082 HIGH SPEED SORTER

A fundamental advantage of the IBM method is that cards, once they have been punched, may be repeatedly arranged and rearranged in different combinations, so enabling a great variety of reports and analyses to be prepared from the one original recording in the cards.

The 082 Sorter embodies many refinements—notably an electronic unit—designed to bring higher speed and efficiency to this classifying operation.

Features of the 082 include:

- *Continuous feeding.* The card hopper may be replenished while the machine is in operation.
- *Automatic run-out.* After the card hopper is empty the sorter continues to operate till all the cards are in their correct pockets.
- *Automatic pocket stop.* When a pocket is full to capacity the sorter is automatically stopped.
- *Selection switches.* These permit the sorter to segregate all cards punched with specified numbers in a column, and to reject the remaining cards without disturbing their sequence. An optional feature is the multiple column selection device which enables cards punched with any specified number of up to 10 digits to be selected.
- *Alphabetic sorting* is simply effected by sorting twice on each column.
- *Speed.* 650 cards per minute.